

Contents

Invited Papers

Microdynamics	1
R. S. Muller (Berkeley, CA, U.S.A.)	

High T_c superconducting based sensors	9
M. Decroux (Geneva, Switzerland)	

General

Noise in sensors.	17
F. Bordoni (Frascati, Italy) and A. D'Amico (Rome, Italy)	

Information transduction in solid-state transducers: a general thermodynamic systems approach	25
D. C. van Duyn and S. Middelhoek (Delft, The Netherlands)	

Study of Nb/AlO _x /Nb superconductor detectors with X-ray and pulse light	33
M. Kurakado and A. Matsumura (Kanagawa, Japan)	

Superfast Fourier transform and its application in dynamic calibration of transducers	37
Wang Shuguang, Lu Hongnian and Pan Deheng (Taiyuan, Shanxi, China)	

A novel bonding technology for GaAs sensors.	40
Qing-An Huang, Shi-Ji Lu and Qin-Yi Tong (Nanjing, China)	

Pressure Sensors

Nonlinearity of piezoresistance effect in p- and n-type silicon	45
K. Matsuda, Y. Kanda, K. Yamamura (Hamamatsu, Japan) and K. Suzuki (Tokyo, Japan)	

A computer-aided intrauterine pressure measurement system based on a silicon sensor element with low deflection and excellent overload protection.	49
P. Øhlckers, R. Clemm, O. Eriksen and H. Jenssen (Oslo, Norway)	

Electrically trimmable silicon micromachined pressure switch	54
D. W. de Bruin, H. V. Allen, S. C. Terry and J. H. Jerman (Milpitas, CA, U.S.A.)	

Passive silicon transensor intended for biomedical, remote pressure monitoring.	58
Y. Bäcklund, L. Rosengren, B. Hök and B. Svedbergh (Uppsala, Sweden)	

A novel pressure sensor structure for integrated sensors	62
Yaoling Wang, Litian Liu, Xinyu Zheng and Zhijian Li (Beijing, China)	

A new pressure sensor with innercompensation for nonlinearity and protection to overpressure.	65
Xian-Ping Wu (Shanghai, China)	

Digital compensation of high-performance silicon pressure transducers	70
S. B. Crary, W. G. Baer, J. C. Cowles and K. D. Wise (Ann Arbor, MI, U.S.A.)	

Silicon pressure sensor with frequency output.	73
R. Schörner, M. Poppinger and J. Eibl (Erlangen, F.R.G.)	

Cooperative development of a piezoresistive pressure sensor with integrated signal conditioning for automotive and industrial applications.	79
S. Ansermet, D. Otter (Bevaix, Switzerland), R. W. Craddock and J. L. Dancaster (Shirley, Solihull, U.K.)	

Single-crystal silicon pressure sensors with 500X overpressure protection	84
L. Christel, K. Petersen, P. Barth, F. Pourahmadi, J. Mallon, Jr. and J. Bryzek (Fremont, CA, U.S.A.)	

Low-pressure sensors employing bossed diaphragms and precision etch-stopping	89
J. R. Mallon, Jr., F. Pourahmadi, K. Petersen, P. Barth, T. Vermeulen and J. Bryzek (Fremont, CA, U.S.A.)	
Ultra-stable, high-temperature pressure sensors using silicon fusion bonding	96
K. Petersen, J. Brown, T. Vermeulen, P. Barth, J. Mallon, Jr. and J. Bryzek (Fremont, CA, U.S.A.)	
A CMOS front-end circuit for a capacitive pressure sensor	102
A. Kjensmo, A. Hanneborg, J. Gakkestad and H. von der Lippe (Oslo, Norway)	
A capacitive pressure sensor with low impedance output and active suppression of parasitic effects.	108
B. Puers, E. Peeters, A. van den Bossche and W. Sansen (Heverlee, Belgium)	
A field-focusing capacitance sensor for multiphase flow analysis.	115
R. W. Time (Stavanger, Norway)	
A new condenser microphone in silicon	123
J. Bergqvist and F. Rudolf (Neuchâtel, Switzerland)	
Pressure-sensitive insulated gate field-effect transistor (PSIGFET).	126
J. T. Suminto and W. H. Ko (Cleveland, OH, U.S.A.)	
Temperature characteristics of microcrystalline and polycrystalline silicon pressure sensors . .	133
Guo Shuwen, Tan Songshen and Wang Weiyuan (Shanghai, China)	
Micromachined beam-diaphragm structure improves performances of pressure transducer . . .	137
Min-Hang Bao, Lian-Zhong Yu and Yan Wang (Shanghai, China)	
Piezoresistive low-pressure sensor with high sensitivity and high accuracy.	142
H. Sandmaier and K. Kühl (Munich, F.R.G.)	
Silicon pressure sensor integrates resonant strain gauge on diaphragm	146
K. Ikeda, H. Kuwayama, T. Kobayashi, T. Watanabe, T. Nishikawa, T. Yoshida and K. Harada (Tokyo, Japan)	
A capacitive silicon pressure sensor with low TCO and high long-term stability	151
A. Hanneborg and P. Øhlckers (Oslo, Norway)	
Diffused silicon wet/wet differential pressure sensor and transducer for minus 100 to plus 120 °C.	155
N. E. Samek and M. Mei (San Dimas, CA, U.S.A.)	
Actuators	
Integrated micro flow control systems.	161
M. Esashi (Sendai, Japan)	
An electrostatic top motor and its characteristics.	168
M. Sakata, Y. Hatazawa, A. Omodaka, T. Kudoh and H. Fujita (Tokyo, Japan)	
A study of three microfabricated variable-capacitance motors	173
M. Mehregany, S. F. Bart, L. S. Tavrow, J. H. Lang, S. D. Senturia and M. F. Schlecht (Cambridge, MA, U.S.A.)	
Frictional study of IC-processed micromotors.	180
Y.-C. Tai and R. S. Muller (Berkeley, CA, U.S.A.)	
<i>In situ</i> friction and wear measurements in integrated polysilicon mechanisms	184
K. J. Gabriel, F. Behi, R. Mahadevan (Holmdel, NJ, U.S.A.) and M. Mehregany (Cam- bridge, MA, U.S.A.)	
Micropump and sample-injector for integrated chemical analyzing systems.	189
S. Shoji, S. Nakagawa and M. Esashi (Sendai, Japan)	
Microfabricated electrohydrodynamic pumps	193
S. F. Bart, L. S. Tavrow, M. Mehregany and J. H. Lang (Cambridge, MA, U.S.A.)	

A thermopneumatic micropump based on micro-engineering techniques	198
F. C. M. van de Pol, H. T. G. van Lintel, M. Elwenspoek and J. H. J. Fluitman (Enschede, The Netherlands)	
Piezoelectric micropump with three valves working peristaltically.	203
J. G. Smits (Boston, MA, U.S.A.)	
Incremental control of a valve actuator employing optopneumatic conversion.	207
K. F. Hale, C. Clark, R. F. Duggan and B. E. Jones (Uxbridge, U.K.)	
Movable micromachined silicon plates with integrated position sensing	211
M. G. Allen, M. Scheidl, R. L. Smith and A. D. Nikolic (Cambridge, MA, U.S.A.)	
Numerical determination of the electromechanical field for a micro servosystem.	215
H. Fujita and T. Ikoma (Tokyo, Japan)	
Application of electric microactuators to silicon micromechanics	219
R. Mahadevan, K. J. Gabriel (Holmdel, NJ, U.S.A.) and M. Mehregany (Cambridge, MA, U.S.A.)	
Thin-film ZnO as micromechanical actuator at low frequencies	226
F. R. Blom, D. J. Yntema, F. C. M. van de Pol, M. Elwenspoek, J. H. J. Fluitman and Th. J. A. Popma (Enschede, The Netherlands)	
Direct optical control for a silicon microactuator.	229
M. Tabib-Azar and J. S. Leane (Cleveland, OH, U.S.A.)	
Spring-type magnetostriction actuator based on the Wiedemann effect	236
V. I. Aksinin, V. V. Apollonov, V. I. Borodin, A. S. Brynskikh, S. A. Chetkin, S. V. Murav'ev, V. V. Ostanin and G. V. Vdovin (Moscow, U.S.S.R.)	
Thin-film processing of TiNi shape memory alloy	243
J. A. Walker, K. J. Gabriel (Holmdel, NJ, U.S.A.) and M. Mehregany (Cambridge, MA, U.S.A.)	
Characteristics of thin-wire shape memory actuators	247
P. A. Neukomm, H. P. Bornhauser, T. Hochuli, R. Paravicini and G. Schwarz (Zurich, Switzerland)	
Shape memory alloy microactuators	253
M. Bergamasco, P. Dario and F. Salsedo (Pisa, Italy)	
Passive wireless actuator control and sensor signal transmission	258
P. A. Neukomm and H. Kündig (Zurich, Switzerland)	
Micromachined structures in ophthalmic microsurgery	263
S. Charles, R. Williams (Memphis, TN, U.S.A.) and T. L. Poteat (Murray Hill, NJ, U.S.A.)	
Epitaxially stacked structures of Si/Al ₂ O ₃ /Si for sensor materials	267
M. Ishida, M. Ashiki, K. Sawada, S. Yamaguchi and T. Nakamura (Toyohashi, Japan)	
Accelerometers	
Monolithic silicon accelerometer	273
B. Boxenhorn and P. Greiff (Cambridge, MA, U.S.A.)	
An ASIC for high-resolution capacitive microaccelerometers	278
H. Leuthold and F. Rudolf (Neuchâtel, Switzerland)	
Measuring simultaneously translational and angular acceleration with the new translational—angular—piezobeam (TAP) system	282
B. Bill (Winterthur, Switzerland) and A. L. Wicks (Blacksburg, VA, U.S.A.)	
Study on the dynamic force/acceleration measurements	285
A. Umeda and K. Ueda (Ibaraki, Japan)	
Photoelectric inclination sensor	289
H. Kato, M. Kojima, Y. Okumura (Nagoya-shi, Japan) and A. Ozaki (Toyota-shi, Japan)	

Design of a solid-state gyroscopic sensor made of quartz	293
J. Söderkvist (Uppsala, Sweden)	
Precision accelerometers with μg resolution	297
F. Rudolf, A. Jornod, J. Bergqvist and H. Leuthold (Neuchâtel, Switzerland)	
A review of low cost accelerometers for vehicle dynamics	303
G. A. MacDonald (Solihull, U.K.)	
A novel silicon accelerometer with a surrounding mass structure.	308
K. Yamada, K. Higuchi and H. Tanigawa (Kanagawa, Japan)	
Capacitive silicon accelerometer with highly symmetrical design.	312
H. Seidel, H. Riedel, R. Kolbeck, G. Mück, W. Kupke and M. Königer (Munich, F.R.G.)	
Semiconductor capacitance-type accelerometer with PWM electrostatic servo technique	316
S. Suzuki, S. Tuchitani, S. Ueno, Y. Yokota, M. Sato (Ibaraki, Japan), K. Sato (Tokyo, Japan) and M. Esashi (Miyagi, Japan)	
Resonators	
Very high Q -factor resonators in monocrystalline silicon.	323
R. A. Buser and N. F. de Rooij (Neuchâtel, Switzerland)	
Electrostatic-comb drive of lateral polysilicon resonators	328
W. C. Tang, T.-C. H. Nguyen, M. W. Judy and R. T. Howe (Berkeley, CA, U.S.A.)	
Resonating microbridge mass flow sensor.	332
S. Bouwstra, R. Legtenberg, H. A. C. Tilmans and M. Elwenspoek (Enschede, The Netherlands)	
A balanced resonant pressure sensor	336
E. Stemme and G. Stemme (Gothenburg, Sweden)	
Resonant-bridge two-axis microaccelerometer.	342
S. C. Chang, M. W. Putty, D. B. Hicks, C. H. Li (Warren, MI, U.S.A.) and R. T. Howe (Berkeley, CA, U.S.A.)	
The application of fine-grained, tensile polysilicon to mechanically resonant transducers. . . .	346
H. Guckel, J. J. Sniegowski, T. R. Christenson and F. Raissi (Madison, WI, U.S.A.)	
Performance of thermally excited resonators	352
T. S. J. Lammerink, M. Elwenspoek, R. H. van Ouwerkerk, S. Bouwstra and J. H. J. Fluitman (Enschede, The Netherlands)	
Novel ultrasonic motors with mono- and bimodal drives	357
M. Fleischer, D. Stein and H. Meixner (Munich, F.R.G.)	
Piezoelectric resonator as a chemical and biochemical sensing device	362
H. Muramatsu, M. Suda, T. Ataka (Chiba, Japan), A. Seki, E. Tamiya and I. Karube (Tokyo, Japan)	
Self-excitation in fibre-optic microresonator sensors.	369
N. A. D. Stokes, R. M. A. Fatah and S. Venkatesh (London, U.K.)	
Vibrating cantilever mass flow sensor	373
R. E. Hetrick (Dearborn, MI, U.S.A.)	
Application of vibrating beam technology to digital acceleration measurement	377
M. A. Meldrum (Costa Mesa, CA, U.S.A.)	
Accelerometer systems with built-in testing	381
H. V. Allen, S. C. Terry and D. W. de Bruin (Milpitas, CA, U.S.A.)	
Optothermal drive of silicon resonators: the influence of surface coatings	387
R. J. Pitcher, K. W. H. Foulds (Guildford, U.K.), J. A. Clements and J. M. Naden (Harlow, U.K.)	
Excitation of silicon microresonators using short optical pulses	391
L. M. Zhang, D. Uttamchandani and B. Culshaw (Glasgow, U.K.)	

